the department of double and variable stars. Into the significance of variable, and especially of "new stars," the author does not enter. Doubtless he is well advised in considering the introduction of such topics premature, but the omission shows that we have a certain class of facts which cannot yet be brought into line with other data. We have not yet succeeded in weaving our information into a consistent whole.

In the second section we have the results of observation mainly as exemplified in the production of star catalogues, whether of place or of spectrum, of brilliancy or of distance, for in these catalogues, applying, as they do, to large areas in the sky, must be contained the information which is to solve the problem of the universe. No inconsiderable portion of this section is occupied with the question of proper motion and the proper method of its treatment. Here we have raised for us, in an acute form, the question of the parallactic as distinguished from the actual motion of the star, and the legitimacy of the assumption as to the absolute lawlessness of direction of the star's own motion. On this and similar points a certain amount of controversy exists, and Dr. Kobold is known to hold very definite views. Fortunately we do not consider it necessary to enter into any of these differences of opinion. We are simply concerned in pointing out the general direction to which the combined information points, and its bearing upon the existence of a stellar system. These conclusions Dr. Kobold collects in his third section, and, greatly daring, has summarised "on half a sheet of note-paper." This statement is so succinctly expressed that it may be reproduced almost literally. Throughout a finite space of spherical form are scattered bodies very different in mass and in physical conditions. With gaseous nebulæ at very low temperature occur other bodies in a condition of glowing heat and advanced condensation. The arrangement of the separate masses is not uniform; they are crowded together in clusters about certain centres of concentration. These groups possess a loose relationship, and are arranged in the form of a spiral having many branches. In the more distant parts of this spiral the hotter and gaseous stars predominate. The sun is comparatively near to the centre of this spiral, and the stars which stand in closest connection with it have also similar physical conditions. On the sun is impressed a motion towards a point in the Milky Way, the principal plane of the whole spiral, and a great number of stars near the sun participate in this same motion. Among the stars there are numerous groups having an apparent motion directed to points in the Milky Way. The stars of each group are in one plane, and their true motion, on the character of which definite information is still wanting, takes place in this plane.

This may seem a very small outcome for so much work, but it will hardly be urged that the author has erred on the side of caution. In any case this "Schlusswort" is valuable, since it expresses the opinion of one who is especially qualified to speak on a subject which possesses in an equal measure both interest and difficulty.

W. E. P.

A PHYSIOLOGICAL STUDY OF THE BRITISH FLORA.

British Flowering Plants. By the Right Hon. Lord Avebury. Pp. xxiii+450. (London: Macmillan and Co., Ltd., 1905.) Price 15*s.* net.

LORD AVEBURY has given us in the past several delightful books on botanical subjects, dealing more especially with the forms and functions of leaves, flowers, and fruits. At the time when the earlier of these books were published there was a tendency to reduce botanical morphology to a cut-and-dried series of shapes and forms, each designated by a Latin name the correctness of which received more attention than the purpose served by the various modifications. In "Flowers, Fruits, and Leaves," and "British Wild Flowers in Relation to Insects," Sir John Lubbock adopted the more natural treatment of studying form in the light of function, with the result that on account of their broad conceptions and the appeal they made to the reasoning faculty, these books obtained a wide circulation, and even now they maintain their position among the foremost contributions to the subject. In the circumstances the author has drawn freely from his previous works in writing this volume, which is restricted to British plants, and contains shorter or longer references to all our flowering plants. It provides, therefore, a running commentary to British floras in general and to Bentham's "British Flora" in particular.

On the details of buds and stipules, a subject that Lord Avebury has studied very carefully, much information is provided. In the genus Lathyrus the shape of the stipules varies from the large foliaceous type of *Lathyrus maritimus* through the narrow sagittate stipules of *Lathyrus pratensis* to the minute, slender stipules that occur in *Lathyrus nissolia.* These and other forms found in the genus are collated, and it is pointed out how the shape fits in with the attachment of the leaf to the stem. The complex nature of the stipules of the hawthorn also receives elucidation. A full account is given of the winter buds of the beech, the pine, and the spruce. It will be seen from these that the examination and dissection of the winter buds of trees and shrubs provide a capital exercise for a nature-study class. Considerable attention has been paid to the dichogamous and diclinous conditions of flowers. The ordinary strawberry furnishes a good instance. Darwin distinguished female flowers producing plenty of fruit, complete flowers less fertile, and male flowers naturally bearing no fruit. Schulz observed for the same plant gynomonœcious, andromonœcious, gynodiœcious, and androdiœcious forms. This is only one of several types of variation in the flower that too frequently pass unnoticed. A certain amount of work has been published on floral variation, more recently by students of biometric problems, but there is plenty of opportunity for observations continued over a series of generations to obtain more definite conclusions on the subject of small variations.

An introductory chapter deals with categories and types, as for instance, flowers of water plants,

© 1906 Nature Publishing Group

methods of protection of the flower against rain, &c. The table on p. 18 collating the modes of dispersal of the fruits of our trees and shrubs brings out the facts very distinctly, and similar tabulations will readily suggest themselves. With regard to the individual descriptions, it seems a pity that many are so short and that the vegetative parts have not received more consideration, but obviously in the limits of a single volume this could not be managed. The absence of technical terms, except for the few that are defined in the glossary, renders the book available to all interested in botany. The book is confined mainly to elementary topics, but students of advanced botany will find that they also can learn much from the information supplied, and can obtain not a few references to questions awaiting explanation or requiring more evidence to verify the explanations that have been offered. The illustrations are numerous, well produced, and appropriate.

OUR BOOK SHELF.

Rowing and Track Athletics. Pp. ix+449. The American Sportsman's Library. Edited by Caspar Whitney. Rowing, by Samuel Crowther. Track Athletics, by Arthur Ruhl. (London: Macmillan and Co., Ltd.; New York: The Macmillan Co., 1905.) Price 8*s.* 6*d.* net.

IN this book the history and progress of rowing and track athletics in America are described in a very interesting manner. From the British sportsman's point of view the book will be read with very great pleasure, for it shows how eagerly the Americans have strived, and not in vain, to excel the prowess of the athletes this side of the Atlantic. From the scientific point of view this history is also of value, for it shows the evolution of ideas which have culminated in the present methods.

The old order changeth for the new, and a race cannot now be won as in the old days, when it was customary "to have your friends out in boats on the course and to impede the other crew as much as possible; the race was not always to the swift—if the home man happened to be the slower," as the author here narrates.

At the present day the successful oarsman or track athlete is he who is able to combine with the greatest efficiency a number of variables. In the case of the former, some of these variables include personal fitness, easiness of style, length of oar and width of blade to suit his particular capability, length and weight of boat, and alertness of brain to take advantage of prevailing conditions and possibly unforeseen eventualities.

In this book we see how hard the struggle has been in America to acquire efficiency, and possibly the reason why. In many national characteristics climate plays a very important part, and, in the case of rowing or track athletics, the influence of climate can be clearly detected. The British style of rowing, for instance, has been evolved by Britishers under British weather conditions. The lines on which this efficiency has been secured need not, and should not necessarily, be identical with those evolved in America, since the climate of the latter country is so different from that of the British Isles.

In track athletics the same principle holds, and this is borne out by the fact that, on the average, the American is the fastest sprinter, while the Britisher is best at long distances. In fact, as the author states, "There is, undoubtedly, something magnetic in our American air, at least in the sort of atmosphere that is found in the north-eastern Atlantic States. . . . What the English climate lacks in this stimulating effect it seems to make up in its general soothing and nourishing influence, and if the athlete who has been bred in it is deficient in snap and nervous spring he is strong in endurance and vitality."

Without going into further detail, the reader must be left to read the book for himself. The illustrations, though not very numerous, are typical, and a capital index concludes the volume.

Économie Forestière. By G. Huffel. Tome Premier. Pp. ix+422. (Paris: Lucien Laveur, 1904.) Price 10 francs.

FRANCE has always taken a leading part in sylvicultural science, and the above volume is a good indication of the thorough manner in which this nationally important subject is practised in that country. The French Government has learned by past experience the disastrous results which the injudicious destruction of the forest inevitably brings, but at the same time France can furnish unrivalled examples of the benefits of proper forest management and administration.

The present work is divided into four parts. The first part deals with the use of the forest, both as regards the production of materials applicable to the needs of man and the beneficial influence it has upon the climate. A very interesting historical summary is given of the uses to which the forest was formerly put. This was pretty much the same in all countries, viz. the chase and pasturage. Then came the time when the forest was principally of value in regard to its wood production, especially in France, for firewood, until this was to some extent superseded by coal and other substitutes. A most interesting table is included giving the variations in the price of timber during the nineteenth century in France and Austria. The author also goes into the numerous uses to which timber may be put, and the different substances which are to be got from it by chemical means, from the crude products of distillation to the finest silk. The author further gives a survey of the colonial forests and their products. Then follow two or three chapters dealing with the very important but formerly too frequently disregarded aspect of sylviculture, namely, the influence of the forest on the climate. Very interesting statistics regarding the daily, monthly, and yearly variations of temperature inside and adjacent to the forest are given. Further, the forest influences the humidity of the air. It increases the rainfall. It regulates and preserves the soil-moisture and controls the "flow off" in such a way that disastrous floods and equally pernicious droughts are prevented. The protection forest, and the necessity for its preservation in the high collecting ground, is dealt with in a masterly manner. The forest regions of France, the hygienic influence and æsthetic aspects of the forest, each receives its due share of attention.

In parts ii. and iii. we have a historical account of the forests of France from the very earliest time. Forest administration in all its branches, together with the equipment and training for the State forest service, are fully treated. Part iv., which concludes this volume, contains a vast amount of statistics concerning the present forests and forest regions of France.

The author has evidently spared no pains to make this volume as complete as possible in every way, and it cannot fail to be of great service to those for whom it is written.

© 1906 Nature Publishing Group